

## CLAIMS

What is Claimed is:

1. A motor vehicle comprising:

a powertrain;

a primary driveline for transferring drive torque from said powertrain to a pair of primary wheels; and

a secondary driveline for selectively transferring drive torque from said powertrain to a pair of secondary wheels, said secondary driveline including a hydraulic coupling and a differential assembly interconnecting said pair of secondary wheels, said hydraulic coupling having an input member driven by said powertrain, an output member driving said differential assembly, a transfer clutch operably disposed between said input member and said output member, a clutch actuator operable to engage said transfer clutch for transferring drive torque from said input member to said output member in response to fluid pressure in a pressure chamber, a pump for pumping fluid from a sump to said pressure chamber, and a control valve for venting fluid from said pressure chamber to disengage said transfer clutch in response to the occurrence of either of an over-pressure condition or an over-temperature condition.

2. The motor vehicle of Claim 1 wherein said hydraulic coupling further includes a first flow path between said sump and said pump, a second flow path between said pump and said pressure chamber, and a third flow path between said pressure chamber and said sump, and wherein said control valve is located in said third flow path.

3. The motor vehicle of Claim 1 wherein said control valve has a first chamber in fluid communication with said sump, a second chamber in fluid communication with said pressure chamber, a valve member moveable between a first position preventing fluid flow from said second chamber to said first chamber and a second position permitting fluid to flow from said second chamber to said first chamber, a biasing device for biasing said valve member to its first position, and a mechanism for moving said valve member to its second position when the fluid temperature in one of said first and second chambers exceeds a predetermined temperature valve defining said over-temperature condition.

4. The motor vehicle of Claim 1 wherein said control valve has a first chamber in fluid communication with said sump, a second chamber in fluid communication with said pressure chamber, and a valve member biased to a first position for preventing fluid flow from said second chamber to said first chamber, said valve member moveable to a second position for permitting fluid flow from said second chamber to said first chamber when the fluid pressure in said pressure chamber exceeds a predetermined pressure valve defining said over-pressure condition.

5. The motor vehicle of Claim 1 wherein said clutch actuator is a piston assembly disposed for movement in said pressure chamber, and wherein said control valve is mounted to said piston assembly and includes a moveable valve member for selectively controlling release of fluid from said pressure chamber in response to occurrence of either of said conditions.

6. The motor vehicle of Claim 1 wherein said differential assembly includes an input member driven by said output member of said hydraulic coupling, a pair of output members driving said secondary wheels, and a biasing clutch for selectively limiting speed differentiation between said output members.

7. A motor vehicle comprising:

a powertrain;

a first driveline having a first pair of wheels driven by said powertrain; and

a second driveline having a transfer mechanism driven by said powertrain

and a drive axle assembly for transferring drive torque from said transfer mechanism to a second pair of wheels, said drive axle assembly including an input member driven by said transfer mechanism, an output member, a transfer clutch operably disposed between said input member and said output member, a piston disposed in a piston chamber and actuatable to engage said transfer clutch for transferring drive torque from said input member to said output member, a pump for pumping hydraulic fluid from a sump to said piston chamber, a control valve operable to vent fluid from said piston chamber to said sump in response to the occurrence of either of an over-pressure condition and an over-temperature condition within said piston chamber, first and second output shafts adapted for connection to said second pair of wheels, a differential assembly including a casing driven by said output member and a gearset interconnecting said casing to said first and second output shafts, and a second transfer clutch operably disposed between said casing and said gearset of said differential assembly for biasing torque and limiting slip between said first and second output shafts.

8. The motor vehicle of Claim 7 wherein said drive axle assembly further includes a first flow path for supplying hydraulic fluid from said sump to said pump, a second flow path for supplying hydraulic fluid from said pump to said piston chamber, and a third flow path for venting fluid from said piston chamber to said sump, and wherein said control valve is located in said third flow path.

9. The motor vehicle of Claim 7 wherein said control valve has a valve chamber in fluid communication with said sump, a flow port providing fluid communication between said piston chamber and said valve chamber, and a valve member movable between a first position and a second position when the temperature of the fluid in said valve chamber exceeds a predetermined temperature value, said valve member is operable in its first position to prevent fluid flow through said flow port and is further operable in its second position to permit fluid flow through said flow port for venting said piston chamber in response to occurrence of said over-temperature condition.

10. The motor vehicle of Claim 7 wherein said drive axle assembly further includes a second piston disposed in a second piston chamber and which is actuatable in response to fluid pressure in said second piston chamber to engage said second transfer clutch, and a second fluid pump for pumping fluid from said sump to said second piston chamber.

11. The motor vehicle of Claim 10 wherein said drive axle assembly further includes a second control valve that is operable to vent fluid from said second piston chamber to said sump in response to an occurrence of at least one of an over-pressure condition and an over-temperature condition in said second piston chamber.

12. A motor vehicle comprising:

- a powertrain;
- a first driveline having a first pair of wheels driven by said powertrain; and
- a second driveline having a transfer mechanism driven by said powertrain

and a drive axle assembly for transferring drive torque from said transfer mechanism to a second pair of wheels, said drive axle assembly including an input member driven by said transfer mechanism, an output member, a first transfer clutch operably disposed between said input member and said output member, a piston disposed in a piston chamber and actuatable to engage said first transfer clutch for transferring drive torque from said input member to said output member, a pump for pumping hydraulic fluid from a sump to said piston chamber, a control valve operable to vent fluid from said piston chamber to said sump in response to the occurrence of either of an over-pressure and an over-temperature condition, first and second output shafts adapted for connection to said second pair of wheels, a casing driven by said output member, a second transfer clutch operably disposed between said casing and said first output shaft for biasing torque and limiting slip therebetween, and a third transfer clutch operably disposed between said casing and said second output shaft for biasing torque and limiting slip therebetween.

13. The motor vehicle of Claim 12 wherein said drive axle assembly further includes a second piston disposed in a second piston chamber and which is actuatable in response to fluid pressure in said second piston chamber to engage said second transfer clutch, a third piston disposed in a third piston chamber and which is actuatable in response to fluid pressure in said third piston chamber to engage said third transfer clutch.

14. The motor vehicle of Claim 13 wherein said drive axle assembly further includes a second pump for pumping hydraulic fluid from said sump to said second piston chamber, and a third pump for pumping hydraulic fluid from said sump to said third piston chamber.

15. The motor vehicle of Claim 14 wherein said second pump is operable to pump fluid to said second piston chamber in response to relative rotation between said casing and said first output shaft, and said third pump is operable to pump fluid to said third piston chamber in response to relative rotation between said casing and said second output shaft.